

Appl. No. 09/844,175  
Response to Office Action mailed 4/10/2006

In the Claims

Claims 1-30 [canceled].

31. [Currently Amended] A removable electrical interconnect apparatus for removably engaging electrically conductive pads on semiconductor substrates having integrated circuitry fabricated therein, the apparatus comprising:

an apparatus substrate; and

an engagement probe projecting from the apparatus substrate to engage a single conductive pad on a semiconductor substrate having integrated circuitry formed in the semiconductor substrate, the engagement probe comprising semiconductor material and having an outer surface comprising an apex in the form of a knife-edge line and comprising semiconductor material and configured to removably penetrate a single conductive pad of the semiconductor substrate comprising integrated circuitry and to removably penetrate another single conductive pad of another semiconductor substrate also comprising integrated circuitry.

32. [Currently Amended] The removable electrical interconnect apparatus of claim 31 further comprising a projection from the apparatus substrate, and wherein the engagement probe is formed on [[a]] the projection from the apparatus substrate.

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33. [Original] The removable electrical interconnect apparatus of claim 31 wherein the knife-edge line projects from a penetration stop plane.

34. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the knife-edge line projects from a penetration stop plane, the knife-edge line having a tip and having a base at the penetration stop plane, the tip being a distance from the penetration stop plane of about one-half the thickness of conductive pads which the apparatus is adapted to engage.

35. [Currently Amended] The removable electrical interconnect apparatus of claim 31 further comprising a projection from the apparatus substrate, and wherein the engagement probe is formed on [[a]] the projection from the apparatus substrate, the knife-edge line projecting from a penetration stop plane on the projection.

36. [Currently Amended] The removable electrical interconnect apparatus of claim 31 further comprising a projection from the apparatus substrate, and wherein the engagement probe is formed on [[a]] the projection from the apparatus substrate, the knife-edge line projects projecting from a penetration stop plane on the projection, the knife-edge line having a tip and having a base at the penetration stop plane, the tip being a distance from the penetration stop plane of about one-half the thickness of conductive pads which the apparatus is adapted to engage.

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37. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein outermost portions of the apex comprise a first electrically conductive material, and wherein the conductive pads for which the apparatus is adapted to engage have outermost portions comprising a second electrically conductive material; the first and second electrically conductive materials being different.

38. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the engagement probe comprises material of a bulk semiconductor substrate.

39. [Original] The removable electrical interconnect apparatus of claim 31 wherein the knife-edge line includes an outer conductive layer.

40. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the outer surface includes plural knife-edge lines configured to engage the single conductive pads.

41. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the engagement probe is formed from a semiconductor substrate and the outer surface includes plural knife-edge lines configured to engage the single conductive pads.

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42. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the engagement probe is formed from a semiconductor substrate and the outer surface includes plural knife-edge lines configured to engage the single conductive pads and the knife-edge lines include outer conductive layers.

Claims 43-53 [canceled].

54. [Currently Amended] A removable engagement probe comprising semiconductor material and having an outer surface comprising an apex in the form of a knife-edge line and comprising semiconductor material and sized and positioned to penetrate a single conductive pad;

wherein the knife-edge line projects from a penetration stop plane; and  
wherein the knife-edge line is formed on a projection from a substrate.

55. [Canceled].

56. [Previously Presented] The removable engagement probe of claim 54 wherein the outer surface comprises a plurality of apices having respective tips and bases, and the penetration stop plane is intermediate the bases and substantially parallel to a surface of the substrate.

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57. [Previously Presented] The removable engagement probe of claim 54 wherein the knife-edge line has a tip and has a base at the penetration stop plane, the tip being a distance from the penetration stop plane of about one-half the thickness of the conductive pad which the apparatus is adapted to engage.

58. [Previously Presented] The removable engagement probe of claim 54 wherein the knife-edge line projects from the penetration stop plane on the projection.

59. [Previously Presented] The removable engagement probe of claim 54 wherein the knife-edge line projects from the penetration stop plane on the projection, the knife-edge line having a tip and having a base at the penetration stop plane, the tip being a distance from the penetration stop plane of about one-half the thickness of the conductive pad which the apparatus is adapted to engage.

60. [Previously Presented] The removable engagement probe of claim 54 wherein outermost portions of the apex comprise a first electrically conductive material, and wherein the conductive pad for which the probe is adapted to engage has outermost portions comprising a second electrically conductive material; the first and second electrically conductive materials being different.

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61. [Previously Presented] The removable engagement probe of claim 54 wherein the probe comprises material of a bulk semiconductor substrate.

62. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the knife-edge line is sized and positioned to extend elevationally above an uppermost surface of the apparatus substrate.

63. [Previously Presented] The removable electrical interconnect apparatus of claim 32 wherein the projection includes a surface substantially parallel to a surface of the apparatus substrate.

64. [Previously Presented] The removable engagement probe of claim 54 wherein the knife-edge line projects elevationally above an uppermost surface of the projection which defines the penetration stop plane.

65. [Previously Presented] The removable engagement probe of claim 54 wherein the projection has a surface substantially parallel to a surface of the substrate and the surface of the projection defines the penetration stop plane.

66. [Canceled].

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67. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the apparatus substrate comprises semiconductor material.

68. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the apparatus substrate comprises semiconductor material and the engagement probe comprises semiconductor material of the apparatus substrate.

69. [Previously Presented] The removable engagement probe of claim 54 wherein the engagement probe comprises semiconductor material.

70. [Previously Presented] The removable engagement probe of claim 54 wherein the engagement probe comprises semiconductor material formed from a semiconductor substrate.

Claims 71-74 [canceled].

75. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the apex comprises a solid mass of material devoid of any void space.

76. [Previously Presented] The removable engagement probe of claim 54 wherein the apex comprises a solid mass of material devoid of any void space.

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77. [Previously Presented] An electrical system comprising:

a first electrically conductive pad on a first semiconductor substrate comprising integrated circuitry formed using the first semiconductor substrate;

a second electrically conductive pad on a second semiconductor substrate comprising integrated circuitry formed using the second semiconductor substrate; and

a removable electrical interconnect apparatus configured to removably engage the first and second electrically conductive pads, the apparatus comprising:

an apparatus substrate; and

an engagement probe projecting from the apparatus substrate and comprising an apex in the form of a knife-edge line and wherein the apex comprises semiconductor material configured to removably engage the first electrically conductive pad and to removably engage the second electrically conductive pad.

78. [Previously Presented] The electrical system of claim 77 wherein the apex is configured to penetrate the first and the second electrically conductive pads.

79. [Currently Amended] An electrical system comprising:

a single conductive pad;

a removable engagement probe comprising semiconductor material and comprising an apex in the form of a knife-edge line and comprising semiconductor material and sized and positioned to removably engage the single conductive pad; and

wherein the knife-edge line projects from a penetration stop plane.

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80. [Previously Presented] The electrical system of claim 79 wherein the apex is configured to penetrate the single conductive pad.

81. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the apex in the form of the knife-edge line comprises a polyhedron.

82. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the apex in the form of the knife-edge line comprises a triangular prism.

83. [Previously Presented] The removable engagement probe of claim 54 wherein the apex in the form of the knife-edge line comprises a polyhedron.

84. [Previously Presented] The removable engagement probe of claim 54 wherein the apex in the form of the knife-edge line comprises a triangular prism.

85. [Previously Presented] The electrical system of claim 77 wherein the apex in the form of the knife-edge line comprises a polyhedron.

86. [Previously Presented] The electrical system of claim 77 wherein the apex in the form of the knife-edge line comprises a triangular prism.

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87. [Previously Presented] The electrical system of claim 79 wherein the apex in the form of the knife-edge line comprises a polyhedron.

88. [Previously Presented] The electrical system of claim 79 wherein the apex in the form of the knife-edge line comprises a triangular prism.

89. [Currently Amended] A removable engagement probe comprising semiconductor material and having an outer surface comprising an apex in the form of a knife-edge line and comprising semiconductor material and sized and positioned to penetrate a single conductive pad;

wherein the knife-edge line projects from a penetration stop plane; and

wherein the outer surface comprises a plurality of apices having respective tips and bases, and the penetration stop plane is intermediate the bases and substantially parallel to a surface of a substrate.

90. [Canceled].

91. [Canceled].

92. [New] The electrical system of claim 79 wherein the knife-edge line has a tip and has a base at the penetration stop plane, the tip being a distance from the penetration stop plane of about one-half the thickness of the single conductive pad.